

Developing Executive Function



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What is executive function???



Executive Function

- “Executive Function” is a term derived from the psychology literature and refers to a cluster of cognitive processes harbored in the prefrontal structures of the frontal lobe.
- These processes affect tasks that require planning, organization, memory, time management, and flexible thinking.

Executive Function

“Currently, there is no universally accepted definition of executive functioning, nor is there a mutually agreed upon list of cognitive components which comprise executive functions.”

- Maricle, Johnson, and Avirett (2010)

Just Some Perspectives on Executive Function

- A set of processes that are essential for engaging in independent, purposeful, self-directed behaviors
(Lezak, Howieson, & Loring, 2004)
- Independent but interrelated components of attentional control, goal setting, and cognitive flexibility
(Anderson, Levin & Jacobs, 2002)
- An array of cognitive abilities that makes the human brain a unique, organized, and sophisticated structure
(Goldberg, 2002)

Source: *Maracle, Johnson & Avirett, 2010*

From An ABA Perspective..

- What do these words mean???
- Most of these are not standard parts of our behavioral terminology

But they do represent a big part of the stuff we do to assist students in many school settings.



Today's Agenda

What is "Executive Function" ?

Providing Behavioral Support to Assist
Students and Young Adults

Developing Executive Function Skills to
younger learners through Intensive ABA
Instruction

Autism

The Behavior Patterns that We Encounter

Deficits

- Language
- Attention
- Social Skills
- Cognitive Skills
- Sensitivity to certain types of stimulation

Excesses

- Self-Stimulatory Behavior
- SIB
- Stimulus Overselectivity
- Splinter Skills
- Inappropriate Behavior

(Source: COSAC Parent Services)

Executive Function Skills



While definitions of Executive Function vary across the literature, it is noted that strong Executive Function Skills enable individuals to engage in goal-directed and/or problem-solving behavior.

Dr. Jonathon Tarbox (2010)

Restricted Behavior

- Insistence on Sameness
- Inflexible/Routines
- Rigid Thinking
- Fixated Interests
- Perseverative Behavior



**Executive
Function**

(Tarbox, Stoddard & Harris; 2010 Missouri Association for Behavior Analysis Annual Conference)

Some Components of Executive Function

Goal Selection	Flexible Thinking
Planning	Adaptability
Sequencing	Self-Observation
Organizing	Self-Evaluation
Initiating	Self-Regulation
Maintaining	Self-Reacting
Executing Goals	

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See how these can be difficult for our learners ?

How We Can Help ?



What Does an Executive Function Weakness Look Like?

<https://www.youtube.com/watch?v=2QV1X3u1o3c>

The Ways We Can Help ASD Students

1. We can build the repertoires necessary for good Executive Functioning.
 - Long-term process & starts with EIBI
2. We can provide prompts and then fade them as our learners demonstrate independence.
 - Always our goal – to create independence!
3. We can provide supports to assist in these difficult areas.
 - Different than prompts – not planning to fade

A Few Words About Supports

We all have strategies that we use to help us with organization and problem-solving.

How would you feel if you didn't have your supports?

Think You'd Manage?

Try getting through the day without one of these:



Selecting Supports

We all have strategies and supports we use to help us with organization and problem-solving.

Technology

Calendars

Checklists

Notebooks

Organization

Keep these in mind when creating and selecting supports for our learners.

In The Classroom



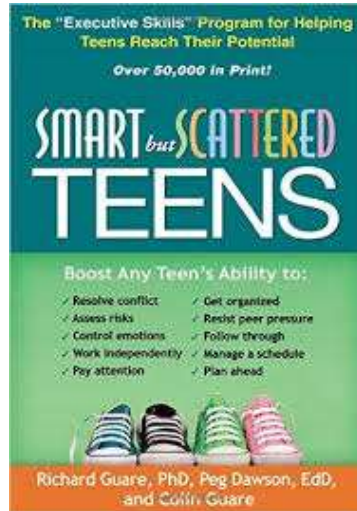
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Executive Function in the Classroom

- Just a few examples of daily classroom expectations which require executive function skills:
 - Completing a long term project
 - Completing a lengthy reading or writing assignment
 - Homework
 - Using technology to gather information
 - Getting to class on time with the right materials
 - Lockers and locks

Impact of Poor Executive Functioning on Students

- Response Inhibition
- Working memory
- Emotional Control
- Sustained Attention
- Task Initiation
- Planning/prioritization
- Organization
- Time Management
- Goal directed-persistence
- Flexibility
- Metacognition



Impact in the Classroom

- Inattention
- Emotional dis-regulation
- Impulsivity
- Poor problem solving
- Disorganization
- Repetition of past mistakes
- Weak long term memory
- Problems with behavioral transitions
- Inability to inhibit or evaluate behavior
- Socially inappropriate behavior

Impact of Poor Executive Functioning for Any Students

(It's not just an ASD thing!)

- Children who struggle with Executive Function may present with academic, social and/or behavioral difficulties.
- They may or may not qualify for special education services.
- May be diagnosed with ADD or ADHD
- It is not unusual for problems with Executive Function to manifest in upper elementary or middle school years.

Some Strategies in the Classroom

- There exist several Executive Function strategies and instructional models for the classroom such as the Benchmark model and Drive to Thrive.
- These models agree that strategies should be taught explicitly, in a structured and systematic manner, and with lots of teacher modeling and practice, practice, practice.

Evidence-Based Interventions

- As recently as 2010, the majority of published research on Executive Function interventions was with adult subjects.
- There has been more attention recently to adolescents and younger learners with Executive Function difficulties.

Some Supports from the ABA Literature

- Individualized Visual Schedules & Checklists
 - Photo Activity Schedules (Krantz & McClanahan)
 - Individual visual schedules/planners
 - Taught to reference classroom schedules
 - Written checklists
 - Task specific
 - Class specific
 - Across the day
 - Technology-based strategies
- Timers & First/Next Boards
 - Build more independence
 - Visual/Auditory reminders for environmental contingencies
- Self-Monitoring Strategies

General Environmental Strategies for the Classroom

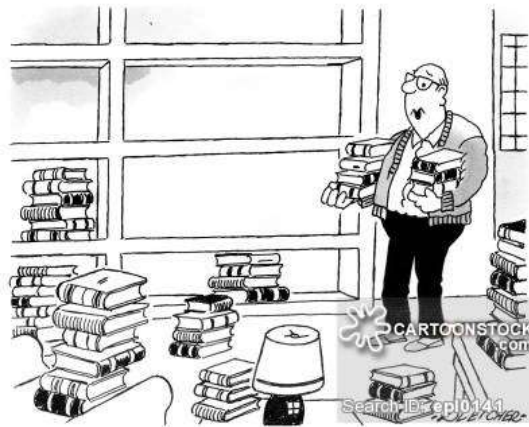
- Organize storage with visual signs
- Minimize classroom clutter
- Use pictures and symbols to demonstrate task sequences
- Offer checklists...for everything
- Put “stop” signs on doors

Be a Role Model



Some Compensatory Strategies for the Classroom

- “Get ready to listen”
- “Stop, Think, Plan, Do”
- Chunk information
- Check for recall and comprehension
- Video and audio tape social interactions
- Role play
- Fluency tasks
- Use timers
- Social stories



"WHERE IN THE WORLD DID I PUT THE BOOK,
"HOW TO ORGANIZE YOUR HOME LIBRARY"?"

Motivation First



- Might mean holding back on your own priorities
- Create curriculum with opportunities for passion (Remember choice making!)
- Together break task down into goals/steps/plan
- Together measure progress
- Together modify as needed
- *Fade the together part!!!!*
- *Differentiate instruction!!!!*

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Sample Goal Sheet

My Goals are:

1. _____ 2. _____ 3. _____

How did I do?

Goal 1 Rating (circle one)

Unsatisfactory Needs Improvement Satisfactory Honors
1 2 3 4

Goal 2 Rating (circle one)

Unsatisfactory Needs Improvement Satisfactory Honors
1 2 3 4

Goal 3 Rating (circle one)

Unsatisfactory Needs Improvement Satisfactory Honors
1 2 3 4

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LESSON 9 Using an Assignment Calendar Writing an Action List

A. First week of Leslie's October calendar

OCTOBER

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1 <i>Math—p. 97 Sci.—?s p. 321 Eng.—Finish reading</i>	2 <i>Math—p. 97 Sci.—?s p. 321 Eng.—Book report— finish reading</i>	3 <i>Eng.—Book report—final draft</i>	4 <i>Eng.—Book report—final draft</i>	5 <i>Sci.—Test ch. 9 Eng.—Book report Football game 6:30</i>	6	7

Action List for Monday Evening, October 1

1. Math—p. 97
2. Sci.—?s p. 321
3. Eng.—Finish reading book
4. Sci.—Take notes on ch. 9

B. First week of Leslie's October calendar

Worksheet for a Single Course

Student Name: _____ Course: _____

Date: _____ Credit Hours: _____

Meeting Days and Times for the Course: _____

Details of the Study Plan: _____

WHEN will you study?

What Days?	What Times?		How Long?	
	Start	Finish	hours	minutes
Monday			hours	minutes
Tuesday			hours	minutes
Wednesday			hours	minutes
Thursday			hours	minutes
Friday			hours	minutes
Saturday			hours	minutes
Sunday			hours	minutes

Weekly Total (Study Hours): _____

WHAT study strategies will you use? (List what you will do.) _____

1

Explicit Teaching/ Task Analysis

- Consider the steps for the following examples..
 - Breaking down a long term assignment into work sessions
 - Setting up an activity schedule
 - Selecting classes
 - Moving from class to class
 - Conversing with a peer
 - Telling supervisor work is done
 - Asking teacher for help
 - Asking teacher for enrichment

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Practice Opportunities

“ I have failed over and over again, that is why I succeed.”

- Michael Jordan



Practice Opportunities

- IEP meetings
- Exposure to temptations
- Assent
- Directions as choices
- Do not solve problems
- Course selection
- 1:1 coaching where possible
- Assignment completion

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BRIEF

(Giola, Isquith, Guy, & Kenworthy, 2000)

- The Behavioral Rating Inventory of Executive Function (BRIEF) is a parent and teacher completed rating scale developed to assess executive function and self-regulation in children and teens.
 - Ages 5-18
 - Approx. 10-15 minutes
 - Global Executive Composite
 - Eight scales
 - Behavioral Regulation Index
 - Metacognition Index



At Home

MORNING CHECKLIST

- Make my bed. 
- Get dressed. 
- Eat breakfast. 
- Clean up dishes. 



And In The Work Environment



Home & Work

- Difficulties with Executive Function also impact learners at home and at work.
- Learners may require the same kinds of supports in these settings as in a school setting.
 - Environmentally Focused Interventions
 - Person Focused Interventions

Continue to be a Role Model



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Explicit Teaching/ Task Analysis

Home & Community

- Consider the steps for the following examples...
 - Cleaning a bedroom
 - Chatting in line at the store
 - Waiting in line
 - What to do if someone cuts the line
 - Finding an item in the store
 - Eating in a restaurant
 - Shopping at the mall
 - Going to a movie

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Practice Opportunities

- Alarm clock
- Shower schedule
- Breakfast
- Lunch
- Backpack
- Dinner
- Laundry
- PROBLEMS!!!!

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Sample Dorm Checklist

Cleaning My Room

Are my books and binders on the shelf where they can be easily found?

Is my desk clear? Can I do work at my desk without having to move things out of the way?

Is the floor clear? Can someone walk through the room without stepping on anything?

Is my dirty laundry in the laundry basket?

Is my clean laundry folded and put away?

Is my bed made (or at least, the comforter pulled up over the sheets)?

Is there any trash lying around that could be put in the garbage?



*“Ms. Jennings, have you seen my
'Organization is the Key to Success' poster?”*

Impact of Poor Executive Functioning at Work

- Attention, memory and following instructions
- Forgetting assignments, following schedules
- Getting tasks done efficiently and on time
- Not having materials to complete assignments

And as a result

- 35 percent of young adults (ages 19-23) with autism have not had a job or received postgraduate education after leaving high school.
(Shattuck et al., 2012)
- In June 2014, only 19.3 percent of people with disabilities in the U.S. were participating in the labor force – working or seeking work.
 - Of those, 12.9 percent were unemployed

(Bureau of Labor Statistics, 2014)

“Soft Skills” in the Work Place

- “Hard skills” are those related directly to a job.
- “Soft skills” such as small-talk, office politics, and team-oriented projects often prove more challenging.
- Even with Executive Functioning difficulties, adults with autism are often more successful with learning the “hard skills.”



Checking Our Checklist

(see what I did there?)

- ✓ **What is “Executive Function” ?**
- ✓ **Providing Behavioral Support to Assist Students and Young Adults**
- Developing Executive Function Skills to younger learners through Intensive ABA Instruction**

Prevent Deficits Right From The Start



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Teaching Executive Function Skills

- The literature recommends that we begin teaching Executive Function skills as early as possible.
- To accomplish this we have to break these skills down into two categories:
 - Dependently functional skills related to EF
 - Immediately functional supports related to EF
- And also take into consideration the ages of the students.

Dependent vs. Immediate Functionality

- Dependently
Functional Skills

- “Tool Skills”
- Component skills
- Those skills that prepare the student for more complex learning.

Younger Students

- Immediately
Functional Skills

- Mands
- Direct effect on environment
- Can be directly generalized to other settings.

As Students Get Older

What Are Immediately Functional Curricula ?

- Typically designed for older students & included students
- Curricula for teaching rule-governed behavior
 - If/Then Conditionals
 - What happens next?
 - Cause/Effect
- Please note how much easier these are to teach/implement if appropriate “tool skills” are already in place
 - Not always possible to build these skills in advance.
 - Use individualized teaching strategies & lots of practice!
 - Discrimination Training
 - Prompting
 - Reinforcement

So, what are “Tool Skills” ?

- Integrating component skills at early stages of intervention to build towards Executive Function.
- **These are skills and “mechanisms” that:**
 - Have a generalized impact on learning and functioning
 - Serve as a foundation for the acquisition of more complex skills

Some “Tool Skills” Related to EF

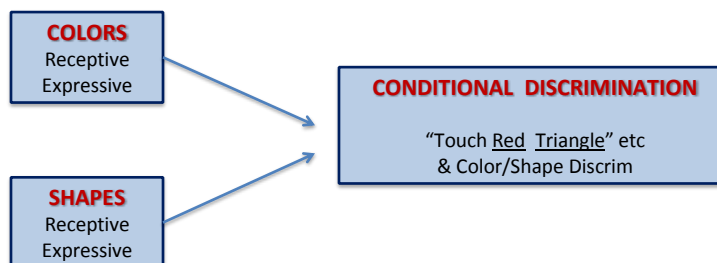
- **Matching-To-Sample**
 - Identical - to Non Identical - to Categorical
 - 3D/3D - 2D/2D - 2D/3D
 - Matching - to Sorting
- **Imitation**
 - Gross Motor - to Fine Motor - to Oral Motor & Verbal Imitation
 - Single Step - to 2-step - to 3 step
- **Chaining & Sequencing**
 - Imitation - to Receptive – to Checklists & Visuals
 - Sequence Cards - to First/Next & Before/After
- **Task Completion & Time On Task**
 - Independent work
- **Conditional Discrimination**
 - Necessary for If/Then rules

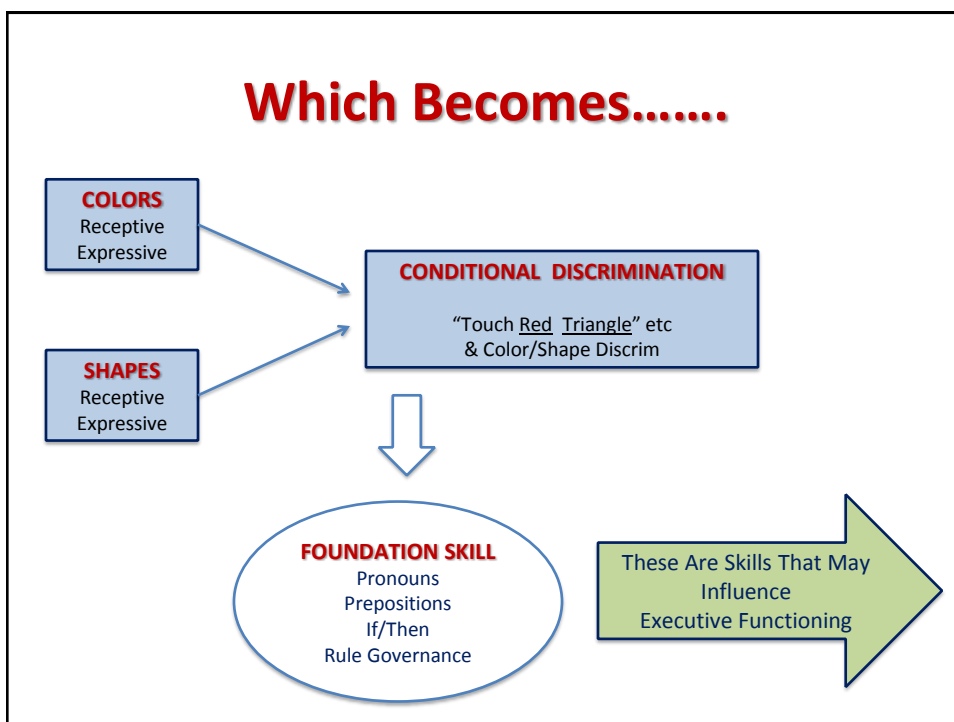
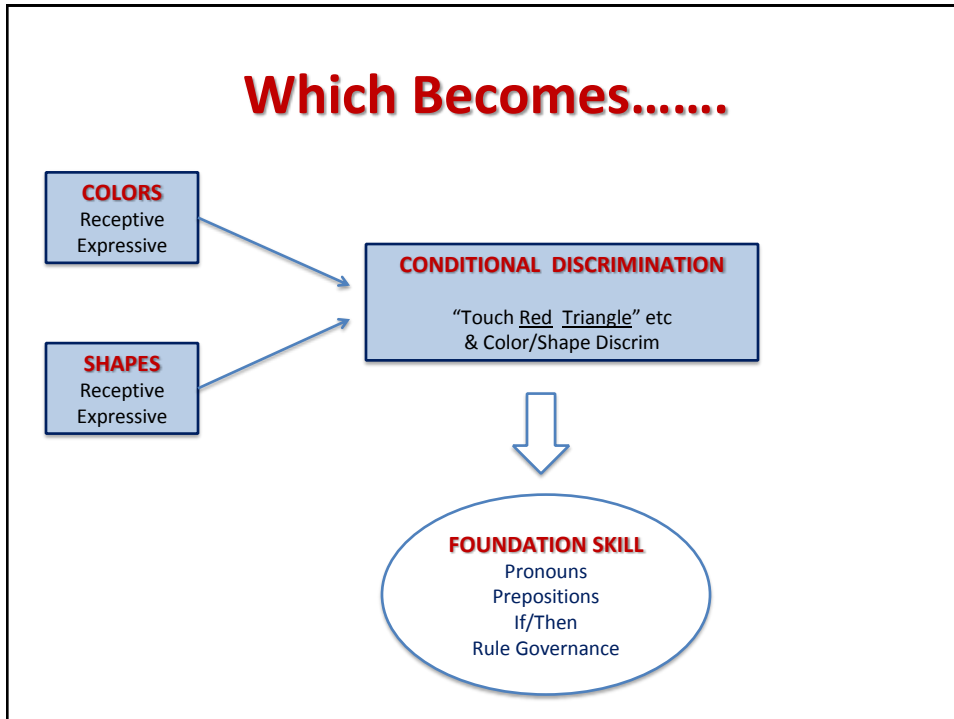
Establishing Generalized Repertoires

Early Intensive Behavioral Intervention & Structured Teaching Experiences

- Starts with relatively simple discriminations and targets general foundation skills.
- As a student progresses, programming becomes more and more language-based.....and more and more complex.
 - Responses go from one step to multi-step.
 - Instructions require multiple discriminations.

An Example





A List of Some Early Learner Skills Related to Executive Function

Stop/go	Sharing Items
Waiting	Sample EF Skills for Advanced Learners
Turn taking	Turn Taking Conversational Topics
Choice making	Using A Calendar/Planner
Manding	Organizing notebook
Match/Sort	Creating To-Do List
Schedule Following	Categorizing
Independent Activity Schedule	Main idea
Labeled Materials	Note Taking
Sequencing	Creating Argument
Sharing Attention	Hand Raising

What does all this have to do with Executive Function?

- The term Executive Function refers to a set of repertoires that provide us with a framework for understanding and relating to different environmental events and expectations.
- Even without prior specific training on a particular behavior or material.
 - “Problem-Solving”
 - Can this be explained within ABA?
 - Can this be taught through ABA Training?

Curriculum Analysis

- **Analyzed according to specific programs or according to more general skills.**
 - “Macro” verses “Micro” skills (McEachin, 2001).
 - “Molar” verses “Molecular” scales of analysis.
- **Intrinsic program coherence (Lund, 2002):**
 - Molecular analysis of skills in each program
 - Molar analysis of inter-relatedness of programs
 - Molar analysis of program sequence outcomes (i.e. identifying end target macro skills)

Curriculum Protocol

We teach specific content...

- Specific response topographies
 - Labels
 - Abstractions
 - Relations
- Factual information
- Multiple exemplar training

... so generalized classes emerge.

- Generalized MTS
- Generalized Imitation
- Conditional Discrimination
- Chaining

As well as....

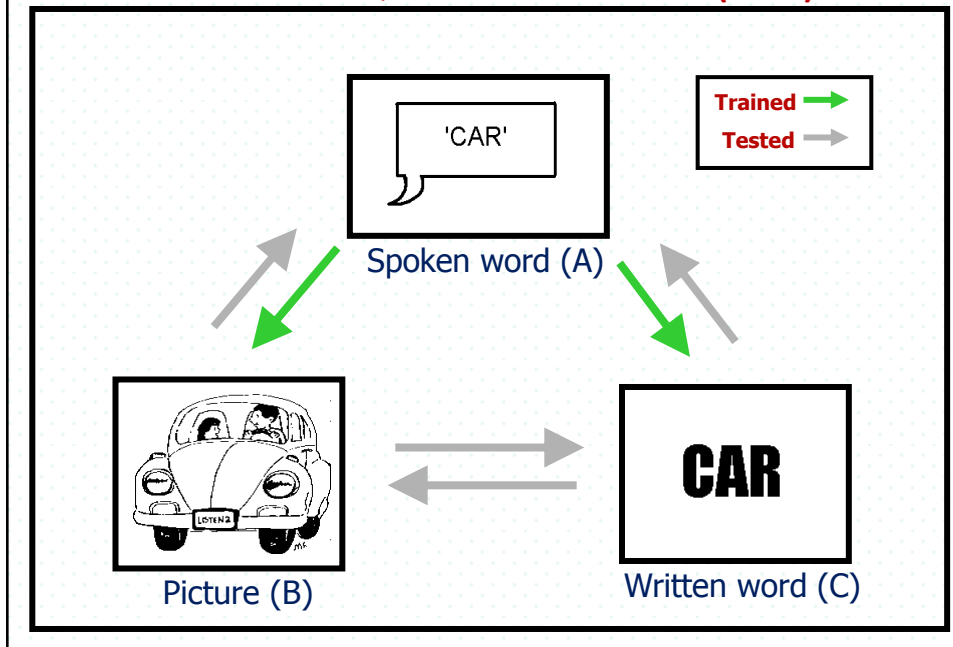
- Variability of responding
- Generative responding
- Relational frames

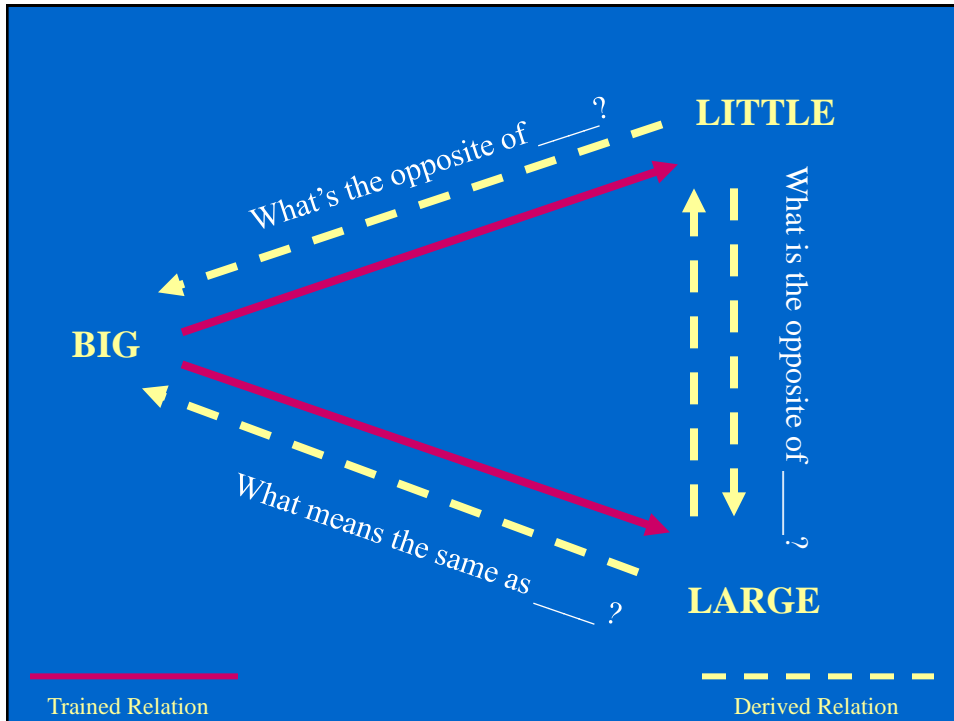
(Lund, 2002)

Higher Order Response Classes

- “Higher-order classes may be a source of novel behavior.”
- Catania, 1998
- Higher order response classes can set the occasion for derived relational responding.
 - Stimulus Equivalence and Relational Frames

STIMULUS EQUIVALENCE: SIDMAN (1971)





ABA and Executive Function

- So, from an ABA perspective, we know that the learning that occurs through an established executive function repertoire is just derived responding right?
- Not so fast!
- Within ABA, there is also an alternative explanation in the form of Joint Stimulus Control.

Joint Control

- Lowenkron's model of joint (stimulus) control provides a framework for understanding the possible role of private events in the performance of public behavior.
- Private events are verbal behavior that are accessible only to the speaker (i.e. thoughts).
 - In radical behaviorist views, private events do not cause behavior, they are behavior.
- Joint Control is presented as verbal mediation of some sort of response.
 - Novel responses mediated through private events and existing repertoires
 - i.e. Self-prompting via private events

????????



Let's Review....

1. The behavioral repertoire sometimes labeled as “Executive Function” is difficult for many individuals on the spectrum to learn and that this can result in many struggles.
2. Many of those skills that make up the Executive Function repertoire can be taught using ABA-based instructional strategies.
3. Learning skills that can impact on the acquisition of “Executive Function” should start at the early stages of an ABA-based curriculum.

Review (cont'd)

4. Behavioral supports and skill-building towards “Executive Function” can be introduced at any time during the education of a student.
5. The curricula we teach can be looked at as focusing on some skills and supports that are immediately functional for students and some that become functional later.
6. Those later, dependently functional skills can become generalized skills that can develop into important components of an Executive Function repertoire.

Review (cont'd)

7. More research is necessary for us to understand and identify the exact behavioral processes that are employed for teaching Executive Function repertoires.

8. For learners in classroom settings, we can provide a variety of environmental and person specific supports to help with organization, problem-solving, and independence.

9. These same classroom supports may be necessary in home, community and work settings to assist with Executive Functioning.

Our Challenges

1. To provide our younger students on the spectrum with the necessary foundation skills to facilitate the development of improved Executive Functioning.
2. To provide the appropriate level of executive function support in classroom settings for our students to be successful.
3. To provide the same kinds of supports in the home, community, and work place.

Some Food For Thought

**“So, everything we are working on
impacts Executive Function?”**

- Overheard at a Recent Conference

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